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Remote Electricity Billing System Using GSM Modem

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ABSTRACT: The advantages of remote meter reading and spot billing are well recognized by the various electricity boards in the country today. Not only does spot billing lead to much greater revenue-collection efficiency and better decision systems, it also brings intangibles like transparency and better customer service to the system. Though there exist various devices in the market that aid in spot-meter billing, none has become either an industry standard or widely prevalent. The reasons range from limited computing power and lack of customizability to high price and absence of local technical support. Remote electricity billing is a unique concept, in which the electricity board can collect the consumed units data from consumer on mobile phone using GSM network. Each consumer is provided with a unique energy meter, which is having a GSM modem, armcontroller unit and a display unit internally. A SIM card is required for communication. Whenever this system receives an SMS from electricity board, it calculates the number of units consumed and billing amount on slab rate, displays on LCD for user interface. This system also sends the same message to the electricity board for departmental information and database. The unique feature of this system is, the electricity board can disconnect or reconnect the connection from remote place through the mobile phone. As this project works on GSM network, the system can be controlled from any part of the world. This project uses regulated 5V, 500mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac out put of secondary of 230/12V step down transformer.

I.INTRODUCTION

Electrical power has become indispensable to human survival and progress. Apart from efforts to meet growing demand, automation in the energy distribution is also necessary to enhance people's life standard. Traditional meter reading by human operator is inefficient to meet the future residential development needs. So there is increased demand for Automatic Meter Reading (AMR) systems which collects meter readings electronically, and its application is expanding over industrial, commercial and utility environment. This traditional energy meter billing techniques require huge number of labor and also long working hours to gather complete data and billing. Sometimes the energy meter is placed in a location where it is not easily accessible, also this data collection may not be completed in first visit and the meter reading staff have to revisit. Manual billing is sometimes restricted and it is slowed down by weather condition or various another reasons. Printed billing has inclination towards losing in the mailbox. In this project, a new method of post-paid electronic energy metering is introduced in this paper which will automatically sense the used energy, records these reading continuously, then sends it to the billing point through the wifi module. Finally, after processing the collected data bill is generated using a web based system software and is send back to the customer as SMS (Short Messaging System) using GSM network. As it is web oriented once the data is updated, the registered usersand authority can monitor and analyze the generated bill of any month by sitting anywhere in the world.

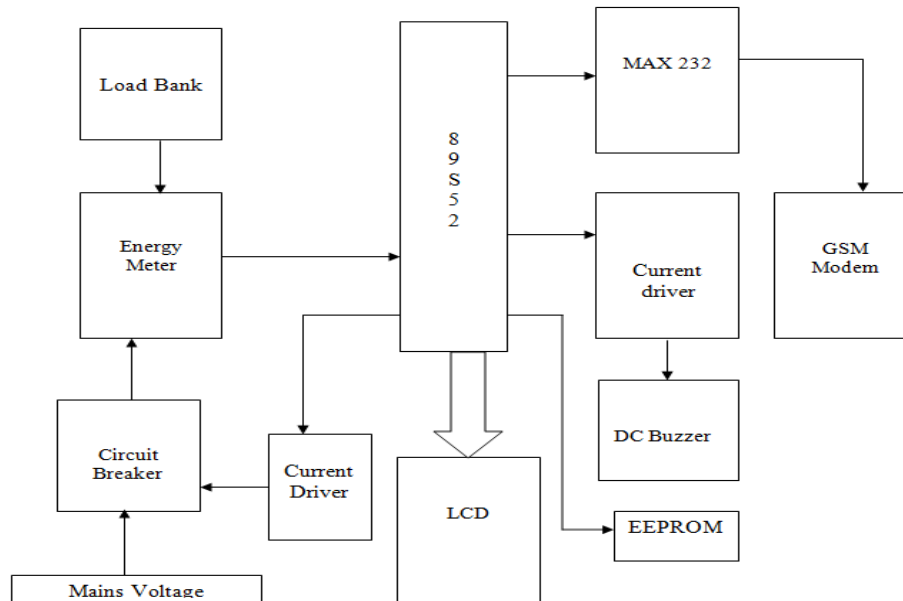


Figure 1: Block Diagram

II.IMPLEMENTATION AND RESULTS

Above Fig shows a complete set up of GSM based energy meter .Microcontroller interfaced with GSM module and energy meter .Pulse and unit in energy meter are continuously increment according to power consumption. For implementation of AMR a SIM card is required for the GSM modem of energy meter .A Identification (ID) number allotted according to SIM contact number. According to requirement of data, electricity department sent a message to particular energy meter. When Arduino received a message, its respective port bit is high and an interrupt signal occurs. Microcontroller starts to execute to the interrupt service subroutine until it reaches last instruction of the subroutine. After executing of RET instruction microcontroller return to main program that is increment of pulse program. After Every one month data will be received by the electricity company automatically and Electricity Company can be access the system at any time on request.

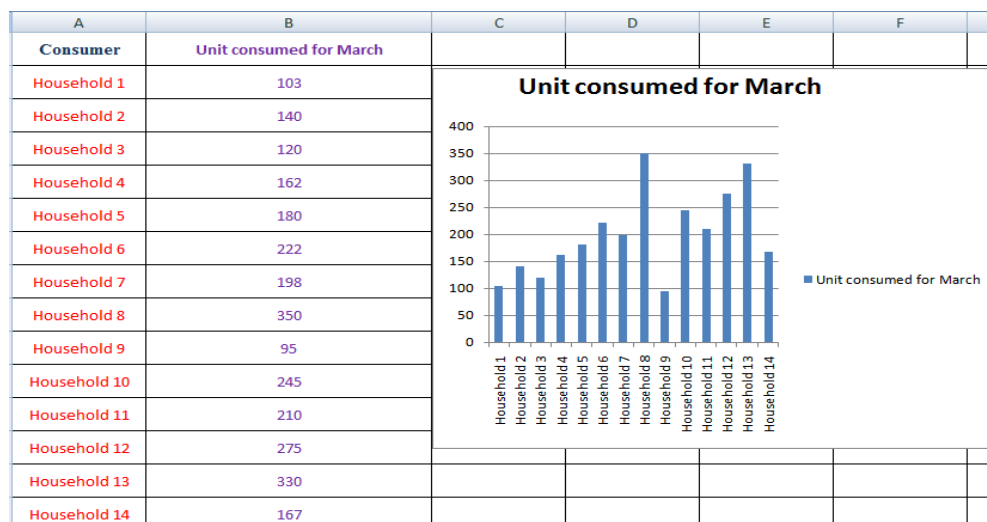


Figure 2: Energy consumption for March with Existing Energy Meter

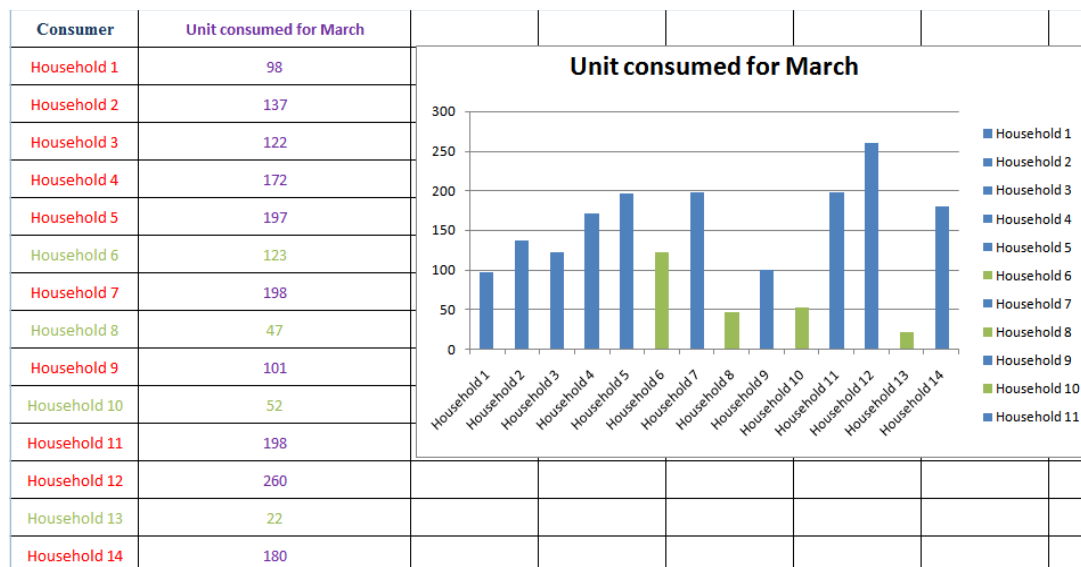


Figure 3 Energy consumption for March with Smart Energy Meter

III.COCLUSION

Remote electricity billing is a unique concept, in which the electricity board can collect the consumed units data from consumer on mobile phone using GSM network. Each consumer is provided with a unique energy meter, which is having a GSM modem, armcontroller unit and a display unit internally. A SIM card is required for communication. Whenever this system receives an SMS from electricity board, it calculates the number of units consumed and billing amount on slab rate, displays on LCD for user interface. This system also sends the same message to the electricity board for departmental information and database. The unique feature of this system is, the electricity board can disconnect or reconnect the connection from remote place through the mobile phone.

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